

What is claimed is:

1. A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture, comprising:

a filament;

an anchor for insertion through the tissue puncture attached to the filament at a first end of the closure device;

a sealing plug disposed proximal of the anchor;

wherein the sealing plug comprises a shape having a higher surface-area-to-volume ratio than an open rectangle for a given set of rectangular dimensions.

2. A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 1 wherein the sealing plug shape comprises at least two folds.

3. A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 2 wherein the at least two folds comprise an S-fold.

4. A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 1 wherein the sealing plug shape comprises a generally rectangular shape folded latitudinally.

5. A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 4 wherein the sealing plug is folded latitudinally a single time at an approximate center of the sealing plug.

6. A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 5 wherein the sealing plug comprises:

a first filament weave pattern in a first portion of the sealing plug, wherein a first portion of the filament extending from a first side of the anchor loops through the first filament weave pattern;

a second filament weave pattern in a second portion of the sealing plug, wherein a second portion of the filament extending from a second side of the anchor loops through the second filament weave pattern.

7. A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 6 wherein the first and second filament weave patterns comprise a five-hole zigzag arrangement.

8. A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 7 wherein the sealing plug and filament comprises biologically resorbable materials.

9. A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 6 wherein the first and second filament weave patterns are disposed in opposing legs of a V-shape.

10. A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 1 wherein the sealing plug shape comprises an X-shape in cross-section.

11. A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 10, further comprising a staggered filament weave pattern in the sealing plug.

12. A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 11 wherein the staggered filament weave pattern comprises alternately passing the filament through generally perpendicular walls of the sealing plug.

13. A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 12 wherein the staggered weave pattern comprises a first set of equally longitudinally spaced hole pairs in a first of the perpendicular wall and a second set of equally longitudinally spaced hole pairs in a second of the perpendicular walls, the second set staggered from the first set longitudinally.

14. A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 1 wherein the sealing plug shape comprises two components, each of the two components folded into a generally U-shape and interconnected with the other.

15. A tissue puncture sealing device, comprising:
an internal component configured to be positioned against an internal wall of a bodily lumen;
a first external component configured to be positioned external to the lumen, the external component comprising at least one fold;
wherein the external component is operatively connected to the internal component by a filament configured to compress and hold the internal and external components together.

16. A tissue puncture sealing device according to claim 15 wherein the internal component is a stiff anchor and the first external component is a collagen sponge.

17. A tissue puncture sealing device according to claim 16 wherein the collagen sponge is folded twice longitudinally.

18. A tissue puncture sealing device according to claim 17 wherein the collagen sponge is substantially S-shaped.

19. A tissue puncture sealing device according to claim 15 wherein the first external component comprises a filament weave pattern, wherein the filament weaves through a first portion of the filament weave pattern, through the internal component, and back through a second portion of the filament weave pattern.

20. A tissue puncture sealing device according to claim 19 wherein the filament weaves through the internal component at approximately a middle of the external component.

21. A tissue puncture sealing device according to claim 19 wherein the first and second portions of the external component comprises two legs of a general V-shape folded along a centerline such that the two legs are substantially aligned.

22. A tissue puncture sealing device according to claim 19 wherein the first external component is folded latitudinally.

23. A tissue puncture sealing device according to claim 15, further comprising a second external component folded and engaged with the first external component.

24. A tissue puncture sealing device according to claim 23 wherein the first and second external components are each folded into generally U-shapes.

25. An internal tissue puncture closure device, comprising:
an anchor for insertion through the tissue puncture;
a filament threaded through the anchor;
a sealing plug attached to the anchor by the filament;
wherein the sealing plug comprises two cross members having a weave pattern through which the filament extends.

26. An internal tissue puncture closure device according to claim 25 wherein the two cross members are arranged in a generally X-shape, and wherein the filament alternately extends through holes in the two cross members in a spiral pattern.

27. An internal tissue puncture closure device according to claim 26 wherein each of two portions of the filament extending from the anchor in opposite directions traverse separate holes through the two cross members.

28. A tissue puncture sealing device, comprising:

a filament;

an anchor for insertion through the tissue wall puncture attached to the filament at a first end of the sealing device;

a flexible sealing plug disposed proximal of the anchor comprising a first half and a second half, the first and second halves comprising a first and second weave patterns;

wherein the filament weaves through the first weave pattern of the first half, through the anchor, and back through the second weave pattern of the second half.

29. A tissue puncture closure device according to claim 28 wherein the first and second halves are folded latitudinally adjacent to one another within the sealing device.

30. A tissue puncture closure device according to claim 28 wherein the first and second halves comprise legs of a V-shape.

31. A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture, comprising:

- a carrier tube having first and second ends;
- an anchor disposed outside of the carrier tube at the first end thereof;
- a sealing plug disposed inside the carrier tube at the first end thereof;
- wherein the sealing plug is folded at least once.

32. A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 31 wherein the sealing plug is tri-folded into an S-shape as seen from an end view.

33. A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 31 wherein the sealing plug is folded from an original V-shape to a rectangular shape.

34. A tissue puncture closure assembly for partial insertion into and sealing of an internal tissue wall puncture, comprising:

an insertion sheath receptive of a closure device;

the closure device, comprising:

a carrier tube;

a filament extending at least partially through the carrier tube;

an anchor for insertion through the internal tissue wall puncture attached to the filament at a first end of the closure device;

a sealing plug disposed inside the carrier tube, the sealing plug comprising a shape having a higher surface-area-to-volume ratio than an open rectangle for a given set of rectangular dimensions.

35. A tissue puncture closure assembly for partial insertion into and sealing of an internal tissue wall puncture according to claim 34 wherein the sealing plug is folded from a V-shape into a generally rectangular shape.

36. A tissue puncture closure assembly for partial insertion into and sealing of an internal tissue wall puncture according to claim 35 wherein the sealing plug is tri-folded longitudinally into an S-shape.

37. A method of sealing an internal tissue puncture, comprising:
providing a closure device having an anchor for insertion through the tissue puncture, a sealing plug disposed proximal of the anchor, the sealing plug comprising a shape having a higher surface-area-to-volume ratio than an open rectangle for a given set of rectangular dimensions;
inserting the closure device partially into the internal tissue puncture;
deploying the anchor;
compressing the sealing plug and the anchor across the internal tissue puncture.

38. A method of sealing an internal tissue puncture according to claim 37, further comprising inserting the closure device into an insertion sheath.

39. A method of sealing an internal tissue puncture according to claim 38, further comprising folding the sealing plug at least once.

40. A method of sealing an internal tissue puncture according to claim 39 wherein the folding comprises folding the sealing plug from a V-shape into a substantially straight shape.

41. A method of sealing an internal tissue puncture according to claim 39 wherein the folding comprises tri-folding the sealing plug longitudinally into an S-shape.